Report on cluster investigation: Cowlitz fetal deaths 1999

Cluster Investigation Team:

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Overview

In response to continuing community concern about a possible excess of fetal deaths for 1999 in Cowlitz County, we conducted an investigation to determine whether a cluster of deaths existed. We concluded that the apparent elevations in fetal deaths were attributable to an elevation in late fetal deaths occurring in the category of 28+ weeks gestation, occurring in the first half of 1999. We have found no patterns which could explain this elevation, and the elevation seen in the first half of the year did not persist in the second half. Infant and fetal deaths are tragic losses for the family and the community. We support the wide range of public health programs aimed at promoting healthy mothers and healthy babies, and recommend that the performance of these measures be assessed. We also recommend close monitoring of reproductive outcomes on an annual basis.

This is a technical report of an analysis that was conducted to investigate the occurrence of increased fetal deaths in a community. While this document provides a very technical explanation of why it is not believed that an increase of fetal deaths occurred in Cowlitz County, the cluster investigation team recognizes the social and emotional impact these deaths have had on these families and their community. Questions regarding this analysis can be directed to Dr Fields at the Cowlitz County Health Department, 360-414-5580 or <mailto:fieldsm@co.cowlitz.wa.us>, or to Dr Chris Hale, consultant epidemiologist for Cowlitz County Health Department, 206-782-0630 (based in Seattle) or <mailto:CHale9100@aol.com>. Dr Macdonald can be reached at the Washington State Department of Health, 360-236-4253 or <mailto:steven.macdonald@doh.wa.gov>.

Background

The background for this report, including a description of the formation of the cluster investigation team, the case definition, use of existing mortality data, and methods for case ascertainment and confirmation, is contained in the previous reports “Report on cluster investigation: Cowlitz perinatal deaths Jan-Mar 1999” and “Report on cluster investigation: Cowlitz fetal deaths Jan-Jun 1999”, both available on the World-Wide Web at <http://www.doh.wa.gov/EHSPHL/Epidemiology/NICE/>. The methods used for this current report are identical with those used in the prior reports.

The second of these two reports, containing analysis of six months of data on perinatal deaths, found six infant deaths and eleven fetal deaths which met the case definition. When all 17 perinatal deaths were considered together, the case series constituted a

statistically significant cluster. However, the number of observed infant deaths for the period did not exceed that expected, and we closed that portion of the investigation in December 1999.

Data analysis

Data analysis consisted of comparison of the observed number of deaths to the expected number of deaths, using the following method. A "Poisson 95% Confidence Interval" is created around the observed number. This confidence interval (CI) is an indicator of the uncertainty which is found when small numbers are examined. This statistic is then compared to the expected number. If the expected number falls outside the range around the observed number, then we label the result "statistically significant" and we conclude that the observed number differs from that expected. If the expected number falls inside the range around the observed number, then we label the result "not statistically significant" and we conclude that the observed number does not differ from that expected.

At the conclusion of case ascertainment and confirmation, 15 fetal deaths were found to meet the case definition, which constituted a statistically significant elevation. The 95% CI around the observed number was 8.4 to 25, a range which did not include the expected number of 5.3. The ratio of observed to expected (O/E) was 2.8, which is a modest elevation. We concluded that the number of observed fetal deaths in 1999 exceeded the number expected, and thus, as in analysis of data from the first quarter of 1999, we returned to the case definition stratification method to examine the influence of gestational age.

Information on the estimated gestational age of the fetal deaths was obtained, and it was found that of the 15 fetal death cases, four were in the category of 20-27 weeks gestation. For these four cases, the 95% CI around the observed number was 1.1 to 10, a range which included the expected number of 2.5, and the O/E ratio was 1.6, which was not statistically significant. We concluded that the number of observed fetal deaths in the category of 20-27 weeks gestation in 1999 did not exceed the number expected, and inferred that the known fluctuations in reporting were most likely responsible for the apparent increase.

For three of the 15 fetal death cases, no estimated gestational age was stated. This is generally consistent with data statewide, where 7% of fetal death certificates lack information on estimated gestational age. (The three cases represent two pregnancies.)

For the eight fetal death cases in the category of 28+ weeks gestation, the Poisson 95% CI around the observed number was 3.5 to 16, a range which did not include the expected number of 2.4. The O/E ratio was 3.3, which is a modest elevation. We concluded that the number of observed fetal deaths in the category of 28+ weeks gestation in 1999 exceeded the number expected.

One pattern was evident in the case series: most of the fetal deaths occurred in the first half of 1999. Five cases occurred in the period Jan-Mar, six cases occurred in the period Apr-Jun, one case occurred in the period Jul-Sep, and three cases occurred in the period Oct-Dec. Data analysis of the four cases which occurred in the second half of 1999 revealed that the observed number did not exceed the expected number (O/E ratio of 1.5, not statistically significant). We concluded that the elevation seen in the first half of the year had not persisted.

Conclusions and recommendations

In this investigation of Cowlitz fetal deaths, the cluster investigation team concluded that the apparent elevations in perinatal deaths were attributable to an elevation in late fetal deaths occurring in the category of 28+ weeks gestation, occurring in the first half of 1999. We concluded that the apparent elevation in early fetal deaths (20-27 weeks gestation) was understandable in terms of variation due to known fluctuations in reporting of early fetal deaths. We had previously discovered no patterns in analyses of the death certificates for the fetal deaths, and thus the elevation remains unexplained.

The fact that the elevation seen in the first half of the year had not persisted has led the team to recommend a return to routine monitoring of these reproductive outcomes. The cluster investigation team also recommends continuation of the development of the Cowlitz County Child Death Review Team. When fully implemented, this process may be well positioned for early detection of clusters and able to identify possible preventive interventions.

Finally, the cluster investigation team also recommends continuation of the community programs aimed at improving and promoting healthy pregnancies. There is much that individuals and communities can do to promote healthy mothers and healthy babies, and this work is an essential foundation for the health of the public. On 1 October 1999, during our initial investigation, the federal Centers for Disease Control and Prevention (CDC) released a report entitled “Achievements in Public Health, 1900-1999: Healthier Mothers and Babies” in its weekly newsletter *MMWR* (available on the World-Wide Web at <http://www.cdc.gov/epo/mmwr/preview/mmwrhtml/mm4838a2.htm>), containing a list of 17 specific “Prevention measures to reduce maternal and infant mortality and to promote the health of all childbearing-aged women and their newborns” (attached). This list of 17 items was reprinted in the Longview *Daily News* on 6 December 1999. We encourage the medical community, in partnership with non-medical community organizations and the Cowlitz County Health Department, to examine the extent to which these measures are being taken in Cowlitz County. Where gaps in prevention are found, opportunities exist to improve reproductive health.

Date of report: 11 December 2000.

CDC Recommended prevention measures

Opportunities to Reduce Maternal and Infant Mortality

Prevention measures to reduce maternal and infant mortality and to promote the health of all childbearing-aged women and their newborns should start before conception and continue through the postpartum period. Some of these prevention measures include the following:

Before conception

- Screen women for health risks and pre-existing chronic conditions such as diabetes, hypertension, and sexually transmitted diseases.
- Counsel women about contraception and provide access to effective family planning services (to prevent unintended pregnancies and unnecessary abortions).
- Counsel women about the benefits of good nutrition; encourage women especially to consume adequate amounts of folic acid supplements (to prevent neural tube defects) and iron.
- Advise women to avoid alcohol, tobacco, and illicit drugs.
- Advise women about the value of regular physical exercise.

During pregnancy

- Provide women with early access to high-quality care throughout pregnancy, labor, and delivery. Such care includes risk-appropriate care, treatment for complications, and the use of antenatal corticosteroids when appropriate.
- Monitor and, when appropriate, treat pre-existing chronic conditions.
- Screen for and, when appropriate, treat reproductive tract infections including bacterial vaginosis, group B streptococcus infections, and human immunodeficiency virus.
- Vaccinate women against influenza, if appropriate.
- Continue counseling against use of tobacco, alcohol, and illicit drugs.
- Continue counseling about nutrition and physical exercise.
- Educate women about the early signs of pregnancy-related problems.

During postpartum period

- Vaccinate newborns at age-appropriate times.
- Provide information about well-baby care and benefits of breastfeeding.
- Warn parents about exposing infants to secondhand smoke.
- Counsel parents about placing infants to sleep on their backs.
- Educate parents about how to protect their infants from exposure to infectious diseases and harmful substances.

Source: CDC. Achievements in Public Health, 1900-1999: Healthier Mothers and Babies. *MMWR* 1999; 48(38);849-858.